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CAPE COD PLANNING AND ECONOMIC DEVELOPMENT COMMISSION

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CAPE COD TRAFFIC COUNTING

PROGRAM REPORT

GOVERNMENT DOCUMENTS
COLLECTION

1986

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by

The Cape Cod Planning and
Economic Development Commission

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EXECUTIVE SUMMARY

The Cape Cod Planning and Economic Development Commission (CCPEDC) has completed the 1986 Traffic Counting Program. This is the third annual traffic counting program conducted by CCPEDC. This report describes the data collection method, the locations and the program results for the 185 traffic counts taken by CCPEDC as part of their Unified Work Program with the Massachusetts Department of Public Works (MDPW).

Actual traffic counts were taken at each site for a 48 hour period. These actual raw counts were then divided by two to establish an Average Daily Traffic (ADT) volume. Then, using factors provided by the MDPW (see Appendix B), the ADT's are adjusted for monthly and day of the week variations to estimate the Annual Average Daily Traffic (AADT). It is important to understand the differences between these figures. The ADT and the peak hour volumes represent actual traffic counts. The factored AADT represents estimated traffic volume on any given day of the year and is based upon sample data. Finally, since counts did not coincide with the beginning and ending of a day, the factor selected was for the day of the week fully covered (for example, if a count ran from 11 AM Tuesday until 11 AM Thursday, a Wednesday factor for that month was used).

The ADTs, AADTs and peak hour volumes are listed in Table 1 (pp. 21-37). Since most of the counts were done during the summer months (peak traffic season), the ADTs (unfactored) are generally higher than the AADTs (factored). Table 2 (pp.38-39) provides a comparison of multi-year counts from 1984-1986. The information in Table 2 should be used carefully as several years of counts are needed to reliably identify growth trends.

The results indicate that many of Cape Cod's roads are at or near capacity in the summertime, based on peak hour traffic volumes. These include many sections of Route 28 from Falmouth to Yarmouth, Route 132 in Barnstable and parts of Route 6 from Dennis to Truro.

Since 1975, traffic volumes at many locations have doubled or tripled (see Table 3, pp.40-41). Between 1984 and 1986, the overall growth rate was approximately 5% per year. At these growth rates, traffic volumes would theoretically increase another 50% by 1995. On many roads this will not happen because they are limited by their capacity. Instead of traffic volumes increasing, congestion will worsen and few cars will pass a given point.

Solutions to the traffic problems on Cape Cod are difficult. Building new roads is difficult in many cases because of existing land uses. Some sections of roads can be improved by widening and some intersections can be improved by optimizing signal timing. Other solutions may include expanding the bike path network and encouraging the use of bicycles as an alternative to automobiles.

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Cape Cod Joint Transportation Committee

Special thanks are given to Natasha Frazier, our Traffic Technician for the Summer of 1986. Without her diligence the number of count locations completed in 1986 would not have been possible.

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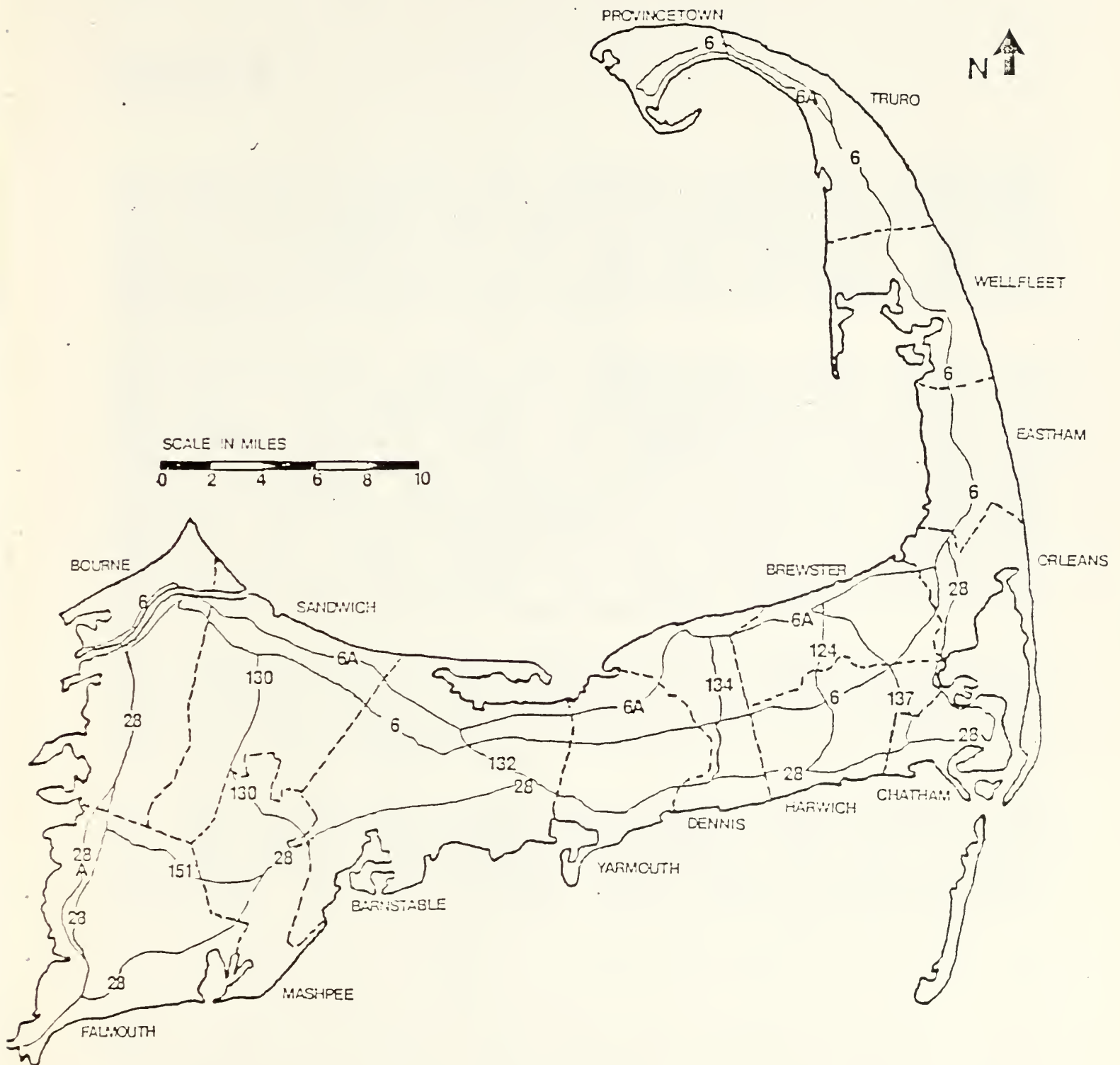
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Figure 1 Cape Cod Region



INTRODUCTION

The Cape Cod Planning and Economic Development Commission (CCPEDC) has completed its third annual Traffic Counting Program. This task was formerly performed by the MDPW and evaluated by the Bureau of Transportation Planning and Development. CCPEDC has expanded its level of local technical assistance that it provides to the fifteen Cape towns by assuming responsibility for these traffic volume coverage counts.

The entire Cape Cod region is experiencing rapid growth and development. At no greater time has planning been so important to Cape Cod. By establishing a comprehensive data bank that coordinates regional, local and state traffic data, CCPEDC is providing a critical service to the various local governments and private interests that require this information for efficient planning. The goal of this program is to provide the information necessary for sound transportation planning and monitor the effects of the Cape's growth on the roadway infrastructure. This should not only lead to better traffic management and smoother traffic flows, but improved safety as well.

The contents of the traffic report include information on how the program was set up and carried out. A brief description of population and street characteristics of each town are presented. Then the raw, factored and peak hour counts are presented in tables in a following section.

This work is made possible as part of the CCPEDC contract with the MDPW to perform transportation planning activities on Cape Cod. This report is produced on an annual basis and will be distributed to all fifteen Cape towns, including Police Departments, Planning Boards and other interested organizations.

SCOPE OF WORK

With a summer time population of just over 500,000 people, the transportation facilities on Cape Cod are often forced to operate over capacity causing a wide variety of safety hazards and congestion delays. These problems are compounded by the continuing rapid development of Cape Cod and its increasing year round use.

Traffic volume counts are an important supplement to population and other data. Year round and seasonal population counts include only residents and overnight visitors. "Day Trippers" which add more vehicles to Cape Cod's road network are not included in population figures. Therefore, not only are traffic counts important for highway planning but they also include a segment of visitors to Cape Cod that might otherwise be unaccounted for.

Count locations were determined by CCPEDC staff, the MDPW and representatives of each town. Seventeen counts were requested by MDPW as "coverage counts" that are used to supplement the MDPW permanent traffic counting locations. CCPEDC staff sent letters to the Boards of Selectmen of the Cape's 15 towns requesting count locations. CCPEDC staff also selected count locations, some as repeat locations to monitor traffic growth and some were at new locations where data was currently unavailable.

Many counts were done in the towns of Dennis, Harwich, Brewster and Orleans as part of the Route 6 Traffic/Safety Study. Route 6 is a two-lane/two-way road through this section of Cape Cod. As the only limited access road through the Mid-Cape, its capacity is severely taxed. Traffic volumes have doubled on Route 6 since 1975 and are still increasing rapidly. Therefore, CCPEDC is closely monitoring volumes on secondary roads through the Mid-Cape in an effort to maintain a satisfactory traffic flow through these towns. Traffic volume information on all roads through this area is critical as it will be several years before construction can begin to increase the capacity of Route 6 between Dennis and Orleans.

Some flexibility in the scheduled count locations was also maintained so that special counts could be done as the need arose. In total, 17 counts were done for the MDPW and 168 were selected by CCPEDC and the towns.

Most of these counts were 48 hour counts, taken on weekdays during July and August. Performing the counts during the summer provides the most useful information about the traffic demands on a road, including the highest peak hour volumes.

WORK PROCEDURE

The start - up date for the program this year was July 1, 1985. Some special counts were taken earlier in the year and some were taken later as requested by MDPW, but most of the counts were done during July and August. A transportation technician was hired to perform the following activities:

- * placement of counters
- * retrieval of counters
- * routine checks of counters
- * equipment inventory and maintenance
- * data tabulation
- * data analysis/reporting
- * coordination of counters
- * coordination of safety measures with towns

The scheduling was based upon 48 hour counts and six traffic counters. This allows for approximately 12 counts per week. This year the staff replaced two old unreliable counters with two newer counters, allowing more counts to be taken on time and to achieve more accurate results. However, due to malfunctions, sometimes only four or five machines would be working properly, causing some counts to be delayed. Field sheets were used to record all pertinent information at each count location (start-up time, weather, road conditions and notable traffic patterns, etc.- refer to Appendix A).

PROBLEMS ENCOUNTERED

Generally, the program ran very well this year, but as can be expected some problems did arise. One problem encountered was the road nails pulling out of the pavement during hot summer days. Another problem that happened occasionally was that the rubber hoses stretching across the road would develop holes or would be vandalized, rendering the count useless.

A third problem is the issue of safety. The scope of the program calls for all field work to be done by a one person crew. In a rural setting such as Cape Cod this is often adequate due to the smaller road facilities. However, with the heavy traffic volumes characteristic of the summertime, a second individual is often needed for slowing down the traffic during set-up. The technician always wore a safety vest and placed cones around the work area.

PRESENTATION AND INTERPRETATION OF DATA

Each traffic counter produces an hourly record of traffic during the counting period. These counts could then be used to determine a peak hour traffic volume. By totaling the recorded data in 24 hour intervals, a daily traffic volume was calculated. The two days were averaged and an Average Daily Traffic volume (ADT) was obtained. This number represents the average number of vehicles using the road each day at that time of year. A factoring process was then employed that adjusts this figure to an Annual Average Daily Traffic (AADT) volume. The AADT represents a theoretical traffic volume for any given day of the year. It must be noted that when traffic volumes are obtained for a period of less than one year the count is considered a sample. The only way to arrive at a true AADT is to monitor each site continuously for a year, which is, of course, impossible because only six counters are available.

The factors used were derived from several MDPW permanent stations located on the Cape that do just that; monitor traffic throughout the year. However, when they are applied to a different site location, the AADT's must be regarded as estimates (see Appendix B for factors).

The information produced from this activity represents current traffic volume conditions. In order to evaluate these figures one must have an understanding of road capacity and the levels of service.

Six levels of service are defined for a roadway, and are given letter designations, from A to F, with level-of-service (LOS) A representing the best operating conditions and level-of-service F the worst. As traffic volumes on a roadway approach the capacity of the roadway, delays and congestion occur. This results in a decreased level-of-service on that roadway. LOS E represents operating conditions at or near the capacity level. LOS F is used to define forced or breakdown flow. LOS E best applies to the major arterials on the Cape but in areas of heavy congestion, LOS F would apply (see Appendix C for level of service definitions). It should be noted that traffic volumes are highest at LOS E. At LOS A, traffic is light and the traffic volumes are relatively low. At LOS F, traffic is so heavy, the road becomes clogged, also resulting in a lower volume of traffic passing a given point.

Our findings indicate that many roads on the Cape are probably at or near capacity during the summer, mainly the principle and minor arterial facilities such as parts of Route 28 from Falmouth to Yarmouth, Route 6 on the single barrel section and parts of Route 6 in Wellfleet and Truro, and Route 132 in Barnstable.

To determine precisely how close a road is to capacity, data other than simply traffic volumes and numbers of lanes must be considered. this information is divided into 2 categories; roadway factors and traffic factors:

The roadway factors include lane width which restricts capacity once it falls below the ideal 12 foot width, the effectiveness of shoulders, surface conditions, and the availability of auxiliary lanes. All of these characteristics are built into the roadway conditions and are constant factors in determining the capacity of the facility.

Traffic factors are more variable in nature with each roadway developing its own composition of users with different habits and characteristics. Variables include the distribution of vehicle types in the traffic stream, and the directional distribution of traffic on the roadway. The greater the number of heavy vehicles and the more uneven the direction of travel on a road, the lower the capacity will be.

Of course, the most congested areas are usually at or near intersections or site drives. These often greatly reduce the practical capacity of a road.

TOWN PROFILES

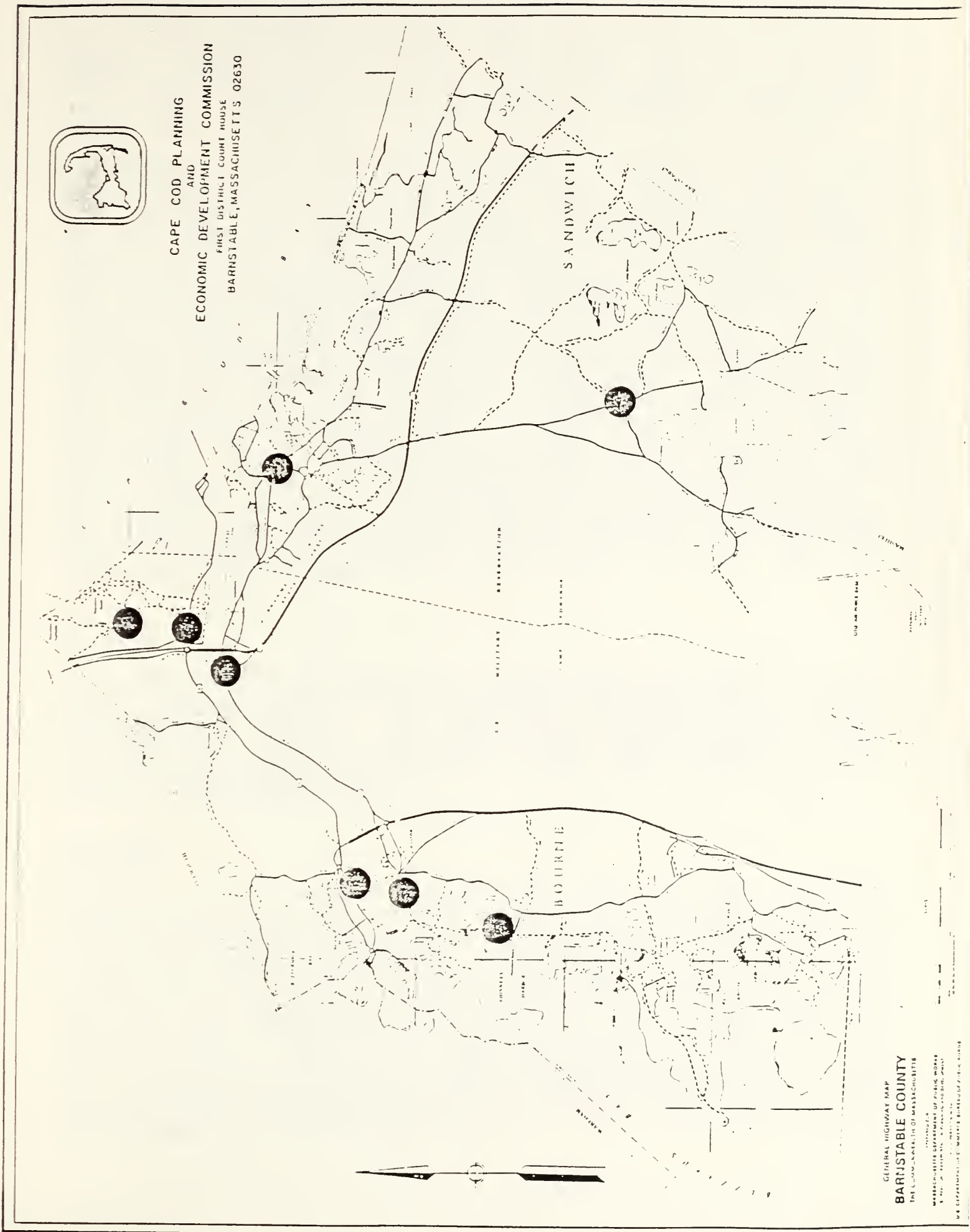
BOURNE

The town encompasses 41 square miles and 163 road miles. It has a year round population of 15,100 and a summer population of 36,300. Six counts were taken in Bourne this summer, five of which were state coverage counts.

All vehicular traffic coming to and leaving the Cape passes through Bourne on one of the two bridges over the Canal. A major relief to traffic and safety problems in Buzzards Bay will be the completion of Route 25 to the Bourne Bridge. This will divert an enormous amount of traffic off of Route 6 and Main Street where traffic volumes are over capacity at this time. Through traffic from the West and South of Massachusetts will no longer be forced to drive through the business district where delays are so common.

The major benefits of completing Route 25 to the Bourne Bridge will be in providing safe passage for vehicles heading on and off Cape Cod and allowing more convenient travel for local traffic in the Buzzards Bay area. A controversial issue is if and where the traffic jams will occur for vehicles crossing the bridges once Route 25 is complete. Currently, about 30% more traffic uses the Sagamore Bridge than the Bourne Bridge. How this changes is uncertain and may depend partially on informational signing.

Figure 2 Location of Bourne and Sandwich Traffic Counts



It should be noted that the bridges are the ultimate constraint for vehicles travelling on or off Cape Cod. Built in the 1930's, their narrow lanes and sidewalks reduce capacity below that for a typical highway travel lane. Replacing the rotaries with cloverleaf interchanges or even building new highways such as the South Side Connector from the Bourne Bridge to the Mid-Cape Highway may only increase congestion at the bridges themselves.

A legitimate traffic and safety concern in Bourne now is the traffic alongside the Canal on the Scenic Highway and Sandwich Road. Sandwich Road is quickly approaching capacity and due to the many new developments planned off of each of these roads, traffic volumes will increase even more. This will only serve to accelerate the onset of delays, accidents and congestion. Short and long range measures should be developed to alleviate the expected traffic problems. Again, one long term solution to the traffic congestion on these roads may be to build the proposed Southside Connector from Route 28 to the Mid-Cape Highway, which would provide a bypass around the two canal roads. Building this road will certainly improve safety and decrease congestion on the Scenic Highway and Sandwich Road. A likely part of the design would also be the replacement of the Bourne Rotary with an interchange. This will result in reduced travel times as the Bourne Rotary has a lower capacity than the Bourne Bridge. If both rotaries were replaced with higher capacity interchanges, the Bourne and Sagamore Bridges would prove to be the ultimate capacity constraint for vehicles travelling on and off Cape Cod during peak travel times.

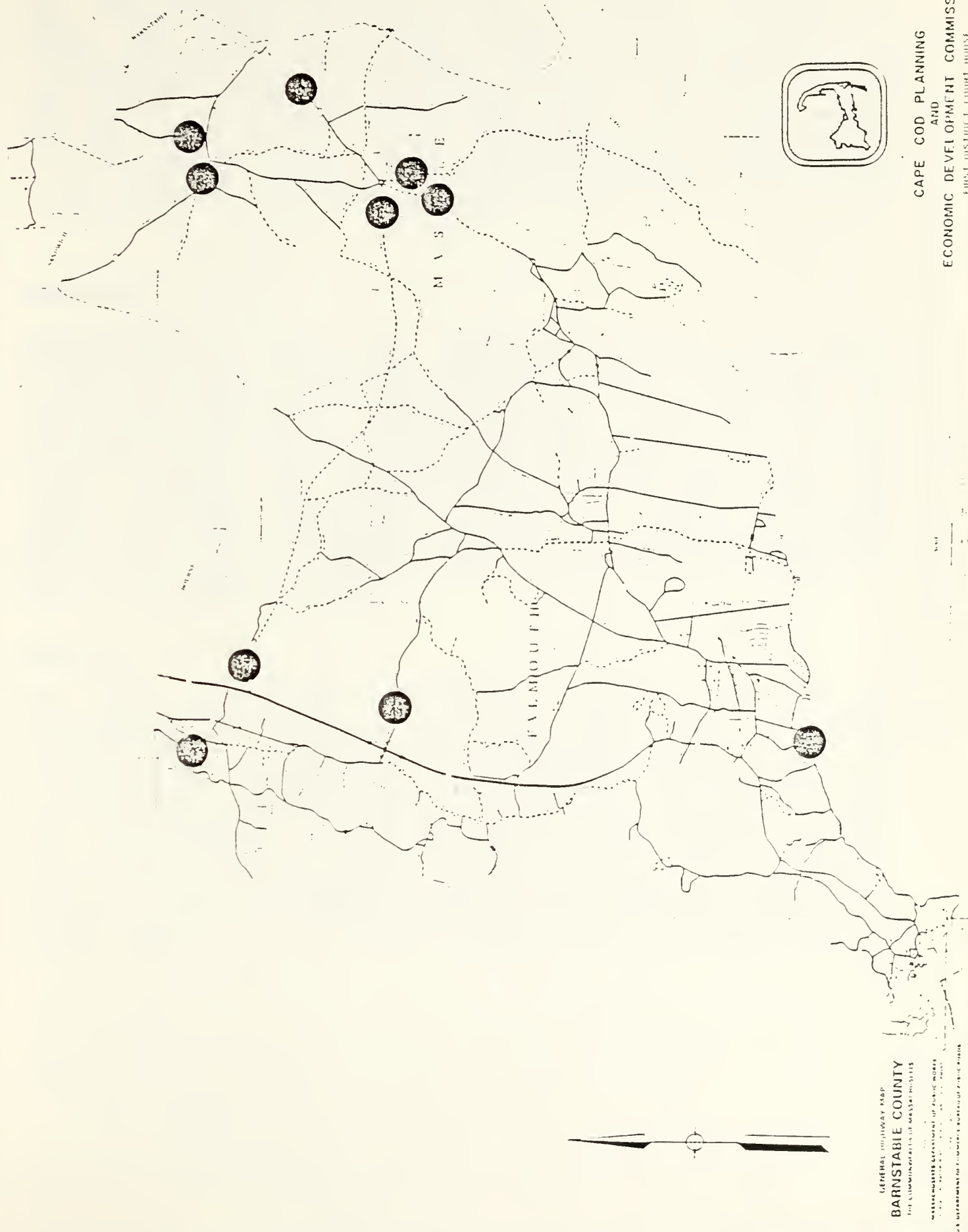
SANDWICH

The town of Sandwich covers 42.61 square miles and over 160 road miles. There is a year round population of 11,180 and a summer population of 26,300. Two locations in Sandwich were counted this year, for a total of eight counts. Both locations are intersections where traffic conditions may warrant traffic signals in the near future.

FALMOUTH

Falmouth is the second largest town on the Cape covering approximately 44 square miles with a year round population of 26,200 and a summer population of 66,100. There are 358 miles of road within the town boundaries. Four locations in Falmouth were counted this year, three of which were state coverage counts. One of the worst traffic problems in the town is being fixed this year with the reconstruction of Route 28 from Jones Road to Sandwich Road. Route 151 could be a major traffic problem in years to come as more and more development occurs along it. The town is presently planning to have a traffic study done of Route 151 and Route 28 in order to predict and plan accordingly for the future demands on these roads.

Figure 3 Location of Falmouth and Mashpee Traffic Counts



MASHPEE

The town of Mashpee covers 23.86 square miles and has a year round population of 5,600 and a summer population of 22,300. The town has 130 miles of roadway within its borders. Six locations were counted for the town this summer. The counts taken on Routes 151 and 28 near the rotary revealed these roads to be at or near capacity during peak hours. With the development of the new downtown Mashpee, traffic conditions at the rotary will get even worse. The construction of Jobs Fishing Road will siphon off some of the rotary traffic, but congestion is still expected to worsen near the rotary. Some alternative to the rotary, such as a signalized intersection, should be considered in the future as development continues along Routes 28 and 151.

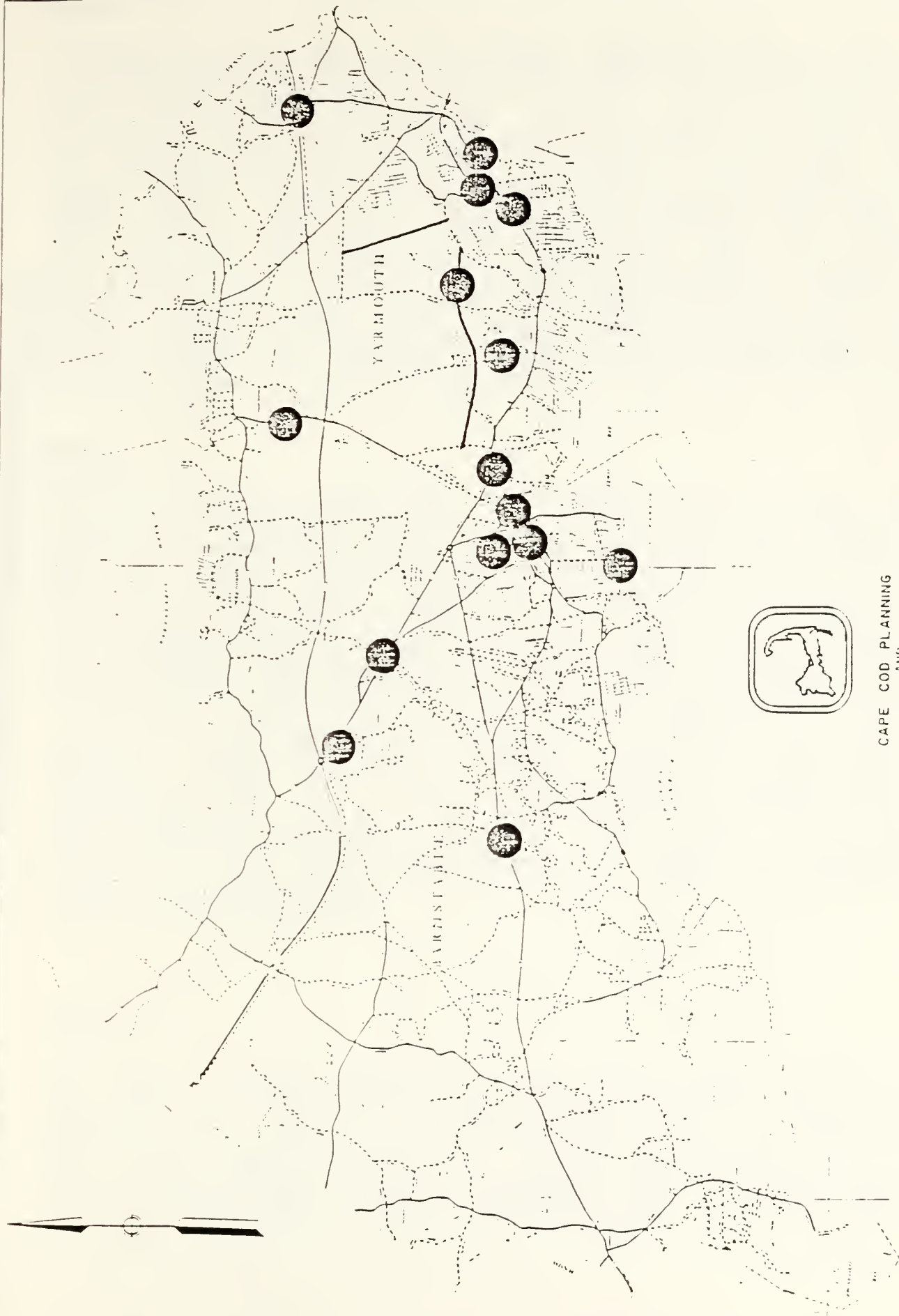
BARNSTABLE

Barnstable is the largest town on Cape Cod, covering 60.17 square miles, with 485 miles of road. It has a year round population of 37,700 and a summer population of 74,300. Seven locations were counted this year with a general increase in traffic of about 4%. Three of the counts were state locations. The worst traffic conditions still occur on the main roads such as Routes 132 and 28, which operate over capacity much of the day during the summer. Traffic continues to increase in Hyannis as well, with volumes on Main Street up 7% from last year. A private consulting firm is currently working on a traffic study of the Hyannis area and their results and recommendations should be ready in the spring of 1987.

YARMOUTH

The town of Yarmouth covers 24.13 square miles and has approximately 255 miles of road within its limits. The year round population is roughly 20,100 while the summer population is around 55,800. Eight locations were counted this year, just one of them being a count required by the state. As expected, Route 28 operates over capacity during the day in the summer time. The Town is currently in the process of fixing another congested area. Station Avenue will be widened to four lanes with traffic signals installed at Whites Path and at Old Town House Road. This will enable the road to handle the expected increase in traffic from two new shopping centers which are being built on Station Avenue.

Figure 4. Location of Barnstable, Yarmouth Traffic Counts



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GENERAL HIGHWAY MAP
BARNSTABLE COUNTY
FOR THE COMMONWEALTH OF MASSACHUSETTS
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
OFFICE OF THE COMMISSIONER OF PUBLIC WORKS
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DENNIS

The town of Dennis has a year round population of 14,400 and a summertime population of 60,000. Contained within its 20.66 square miles are over 210 miles of road. Ten locations were counted in Dennis this year, two of which were state counts. From counts which were repeated this year from previous years, there appeared to be a 2% growth in traffic. The highest counts came on Routes 6 and 28 which operate at or above capacity during summer days. Traffic on Route 134 this summer moved very well due to the new improvements made to the road. The road handled more traffic than ever before with less delays and congestion than in the past. On Route 28 it may be possible to improve the signal timings at each of the traffic lights, which would help to reduce delays at these intersections. When the Theophilus Smith Road / Gages Way link is finished, it will reduce some of the traffic at the intersection of Route 134 and Upper County Road.

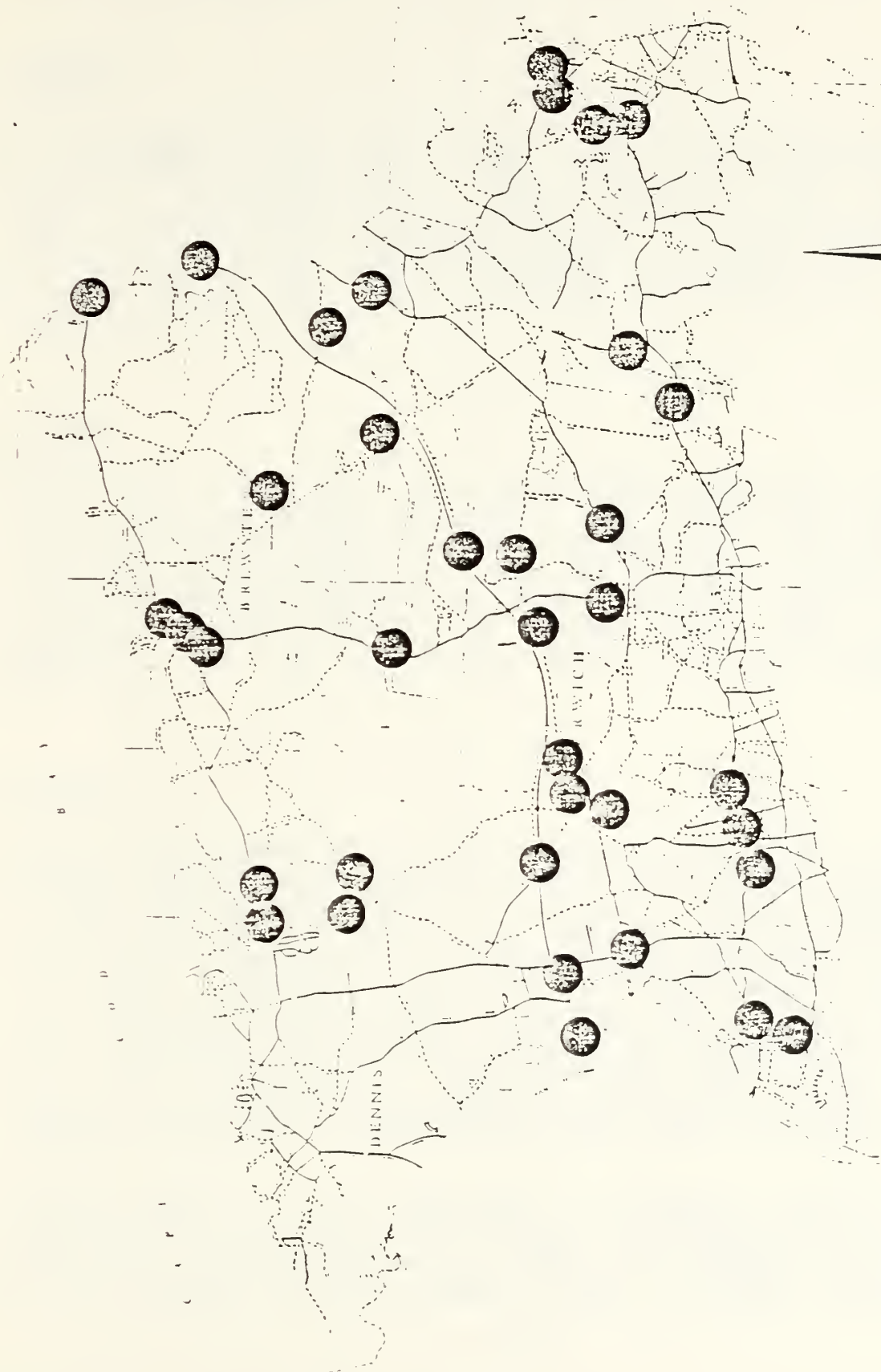
HARWICH

The town of Harwich has a year round population of 10,500 and a summertime population of 29,500. It covers 20.93 square miles and has 167 miles of roadway. Eleven locations were counted this year in Harwich, some of them as part of the Route 6 study of alternate routes. When compared with counts from previous years, traffic has increased each year at a rate of 6%. Traffic will continue to increase in years to come as more and more commercial and residential developments are built. The biggest growth areas traffic wise in the near future will be the intersection of Route 39 and 137; and Queen Anne Road west of Route 124. Plans are underway to widen Queen Anne Road to accommodate the increase in traffic, especially heavy vehicles going to and from the industrial areas. With the new developments planned at the intersection of Route 137 and 39, Route 39 will experience a large increase in traffic, as will Route 137. It is quite possible that some major improvements will need to be made to one or both of these roads and their intersection in order to avoid a serious traffic problem.

BREWSTER

The town of Brewster is one of the fastest growing towns on the Cape with a year round population of 6,600 and a summer population of 24,100. Contained within its 22.55 square miles are over 130 miles of road. The overall increase in traffic was about 5% this year in Brewster. Traffic on Route 6A near Orleans was at capacity this summer, possibly due to some motorists avoiding the single lane section of Route 6 which is also over

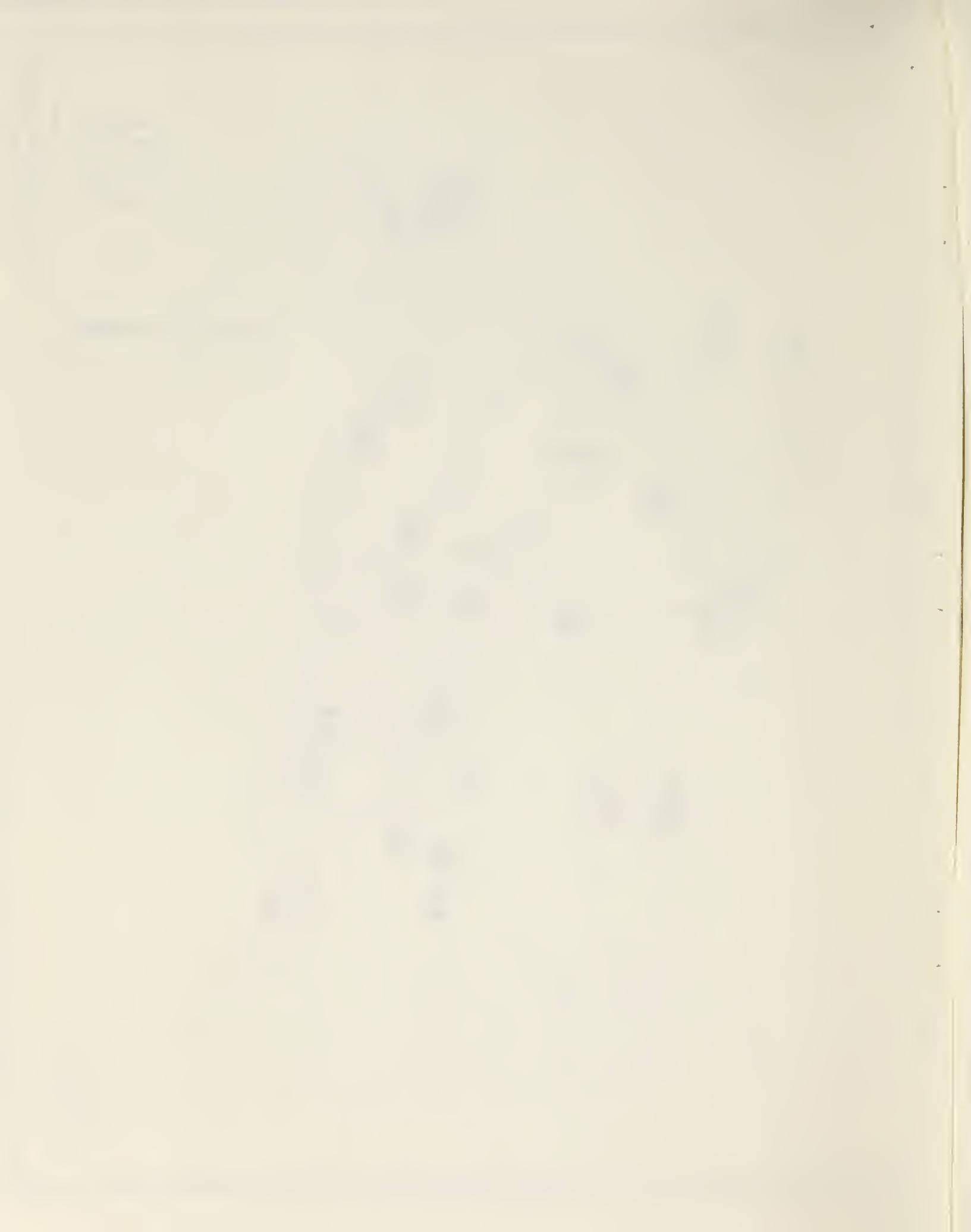
Figure 5. Location of Dennis, Brewster, Harwich, Chatham Traffic Counts



GENERAL HIGHWAY MAP
 BARNSTABLE COUNTY
 This map was made for the Barnstable County
 Highway Department by the Massachusetts
 State Highway Department, 1964.



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 FIRST DISTRICT COURT HOUSE
 BARNSTABLE MASSACHUSETTS 02630



capacity during the summer. This situation will continue to worsen until the other half of the double barrel is built on Route 6. In all, twelve locations were counted in Brewster this year, just one of which was required by the state. The remainder were either requests by the town or part of the Route 6 study.

CHATHAM

The town of Chatham covers 15.58 square miles and has 113 miles of roadways. Its year round population is 6700 and rises to 22,600 in the summertime. Five locations were counted this summer in Chatham and among the findings were that Route 28 is over capacity on the southside of town. As development continues in the town, the other sections of Route 28 will become overburdened as well, causing delays and congestion throughout the town.

ORLEANS

The town of Orleans has a year round population of 6000 and a summer time population of 15,700. There are 13.94 square miles and about 95 miles of roadways in the town. Fourteen locations were counted in Orleans this year which showed traffic to have increased approximately 7% from last year. Route 6 in Orleans was above capacity during peak hours during the summer. See Brewster data for a count of Route 6A at the Orleans/Brewster town line.

EASTHAM

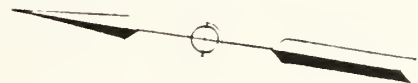
The town of Eastham has a year round population of 4,200 and a summer population of 20,700. The town covers 14.25 square miles of land and has 100 miles of roadway. Three locations were counted in Eastham this year, one of which is an intersection with Route 6 where traffic conditions may warrant a signal to be installed. Traffic on Route 6 in the Outer Cape continues to be very heavy during the summer. In fact, the traffic count taken just north of the rotary recorded the highest peak hour volume (2,999) of any location on Cape Cod which was counted by CCPEDC this year. Congestion often occurs at this point because the westbound traffic is squeezed from two lanes into one before the rotary.

Unlike Route 6 from Sandwich to Orleans, Route 6 in Eastham, Wellfleet and parts of Truro is not a limited access highway. Not only do the hundreds of curb cuts contribute to congestion but they cause safety problems as well. Drivers encounter many

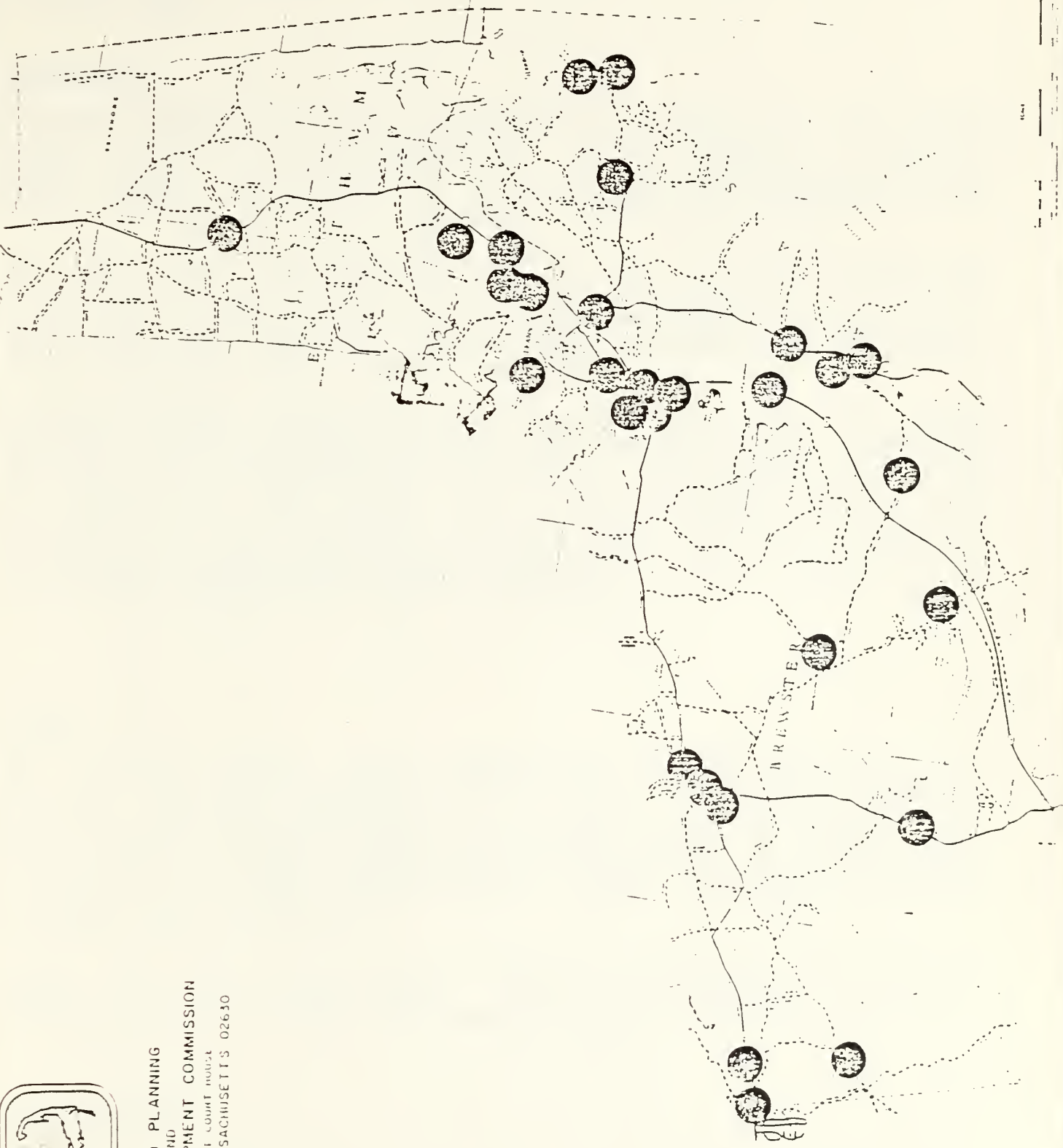
Figure 6. Location of Brewster, Orleans, Eastham Traffic

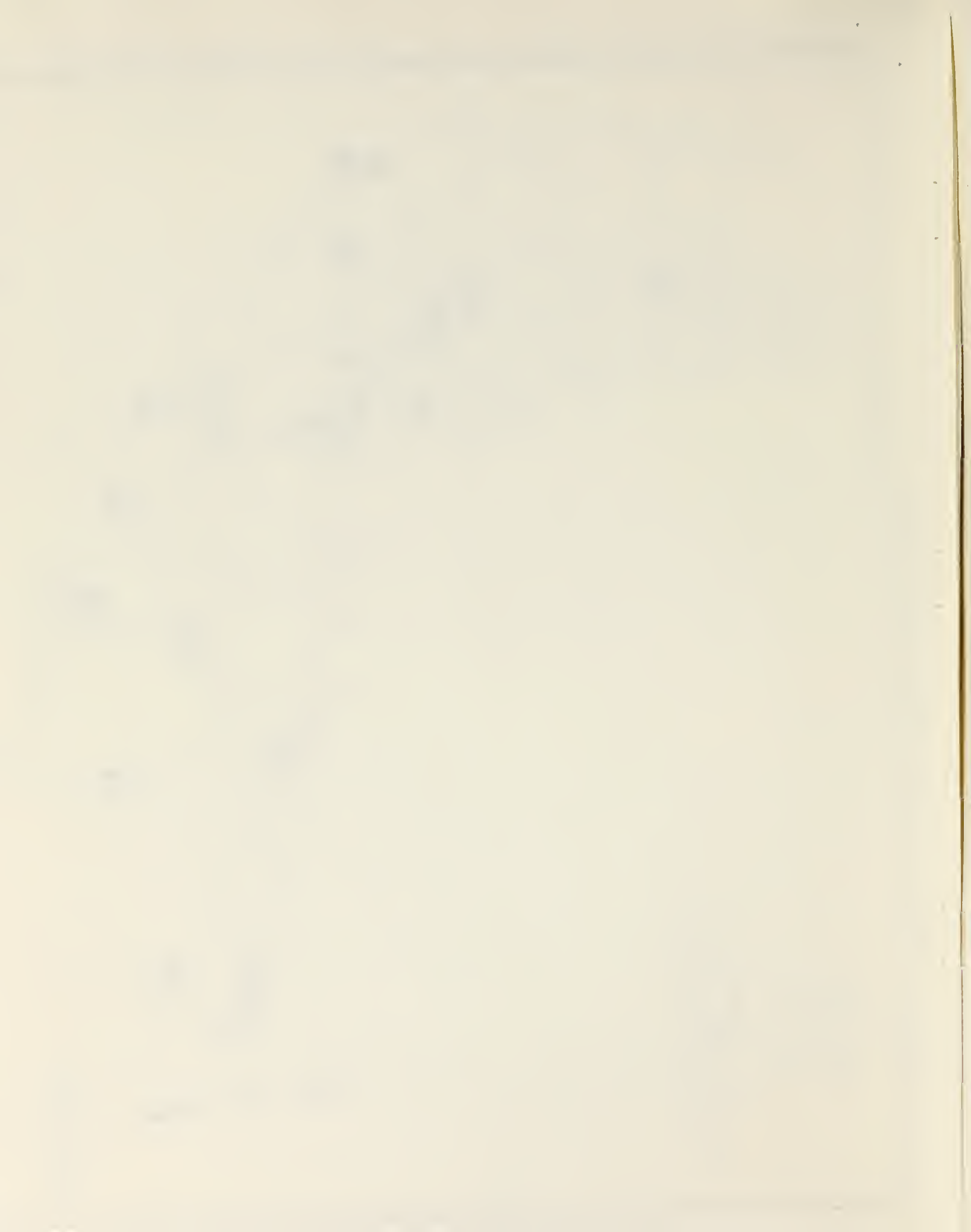


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GENERAL HIGHWAY MAP
BARNSTABLE COUNTY
THE COMMONWEALTH OF MASSACHUSETTS
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
1964





turning conflicts and vehicles turning left often must come to a complete stop before exiting Route 6. This section of Route 6 in Eastham has the highest accident rate of any portion of Route 6 on the Cape.

WELLFLEET

The town of Wellfleet has a year round population of 2,400 which grows to 16,000 in the summertime. The town covers 20.47 square miles and has over 67 miles of road. Eleven different locations were counted this year in Wellfleet and there appeared to be about a 3% increase in traffic this year from last year.

The main arterial through Wellfleet is Route 6 which currently alternates between a two lane, three and four lane layout. The MDPW plans to widen Route 6 in Wellfleet and Truro to four lanes. This may not occur for several years because an Environmental Impact Statement must first be completed.

Traffic volumes on parts of Route 6 in Wellfleet are at or near capacity at peak times during the summer months. This means that any new large developments in the next 10 years before the road is widened to four lanes will have a serious impact on the traffic flow from Eastham to Truro. Steps must be taken in Wellfleet to avoid the density of curb cuts that exist on Route 6 in Eastham. Otherwise, the same safety and traffic problems may arise in Wellfleet that occur in Eastham.

TRURO

The town of Truro is the smallest town population-wise with a year round population of only 1,700 and a summertime high of 15,000. The town encompasses 20.70 square miles of land and has over 60 miles of road. Eight counts were taken in Truro this summer, five of which were on Route 6. These counts showed Route 6 to be over capacity at peak times except for those sections that are four lanes wide.

Again, the MDPW plans to widen Route 6 throughout Truro to four lanes. This will take several years to accomplish, however, because of the required Environmental Impact Statement.

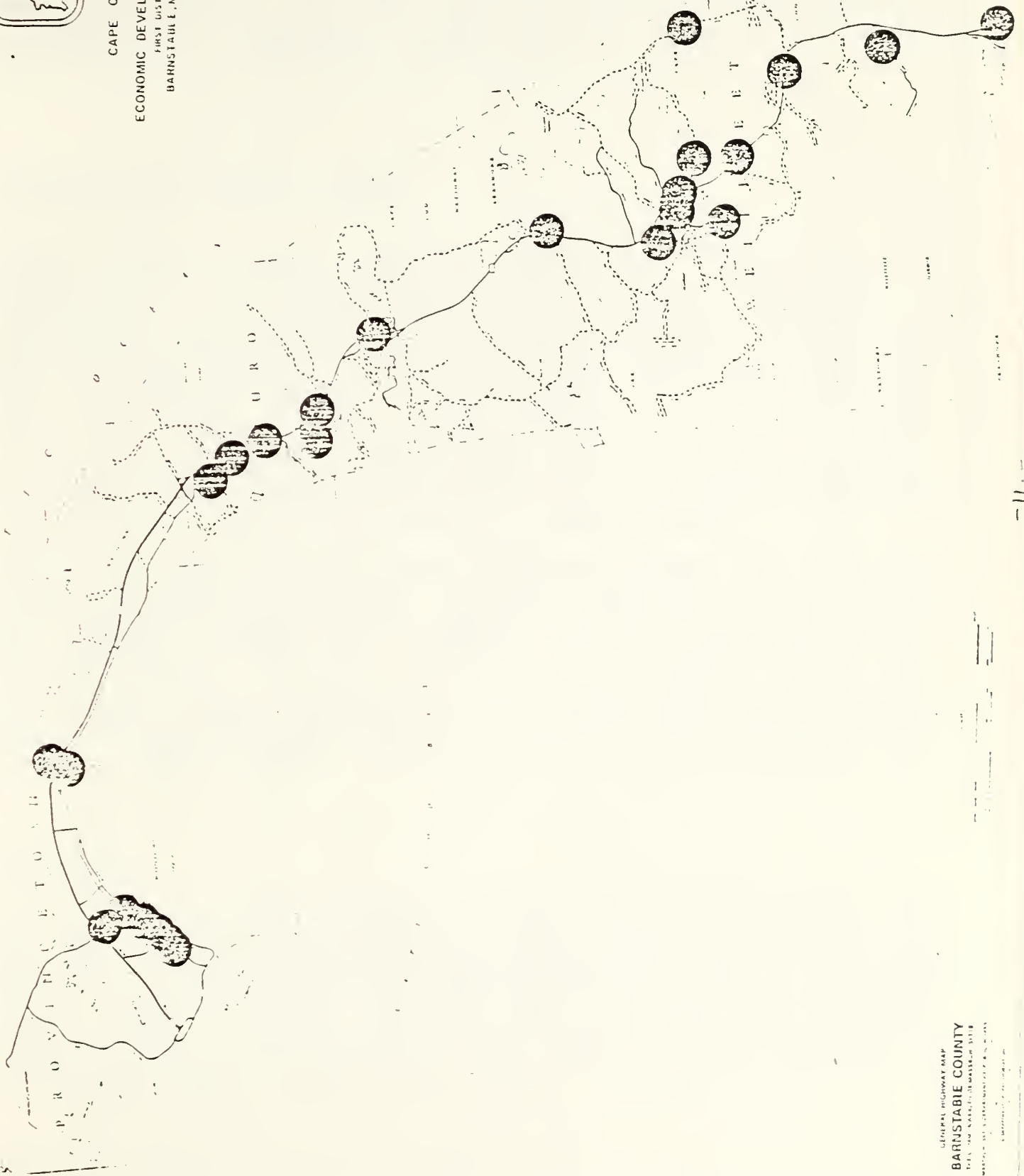
PROVINCETOWN

The town of Provincetown is the smallest town on the Cape, covering just 8.35 square miles and containing 29 miles of roads. The year round population of Provincetown is 3600 and in the

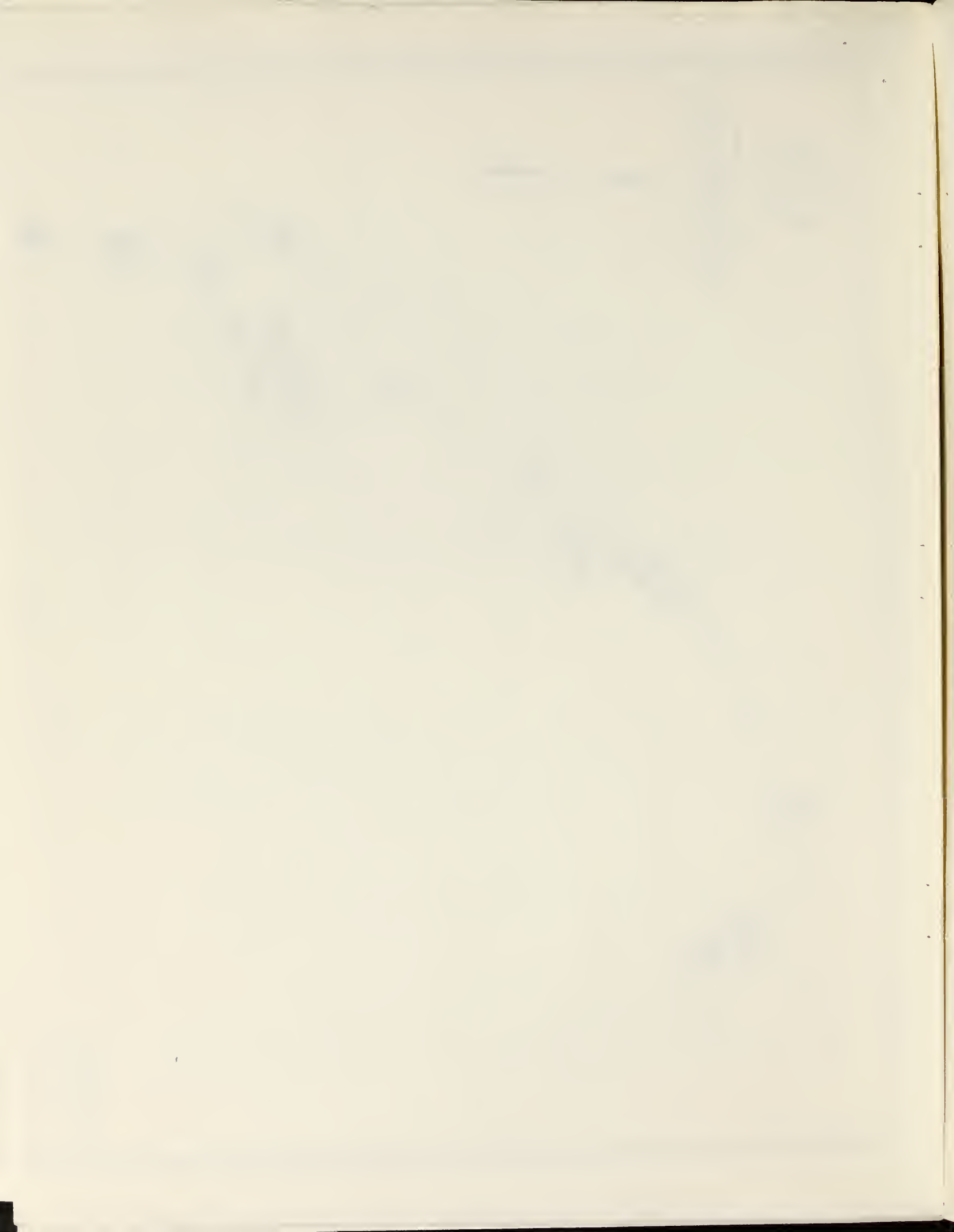
Figure 7. Location of Wellfleet, Truro, Provincetown Traffic Counts



CAPE COD PLANNING
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ECONOMIC DEVELOPMENT COMMISSION
FIRST DISTRICT COUNT HOUSE
BARNSTABLE, MASSACHUSETTS 02630



GENERAL HIGHWAY MAP
BARNSTABLE COUNTY
TOWN AND VILLAGE BOUNDARIES
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
1967



summer it increases to 18,300. Six counts were taken in the town this summer, one being a location required by the state, and the other five on Bradford Street. The counts on Bradford Street indicated that traffic is very close to capacity.

A great deal of the congestion in Provincetown can be traced to insufficient parking and vehicular conflicts with pedestrians. A satellite parking lot away from the center of town would help alleviate some congestion. Some sort of shuttle bus would probably then be required to the center of town.

COMPARISON OF TRAFFIC COUNTS

Table 2 is a list of all summertime counts which have been repeated between 1984 and 1986. This table gives a comparison of the actual raw counts at each site and shows the changes from year to year. While these counts are pretty good indicators of the growth in traffic from year to year, there are various factors which may account for the differences from one year to another. Some of these factors are: day of the week, time of the month, weather, economy, special events in the area. It is very important to gather many years worth of data in order to clearly see what the actual trends in traffic growth are. Two or three years worth of data is only a very small sample and should not be used as solid proof of traffic trends.

Table 3 is a list of 1975 AADTs compiled by MDPW and 1984-1986 AADTs performed by CCPEDC. Traffic volumes have increased substantially over these 9-11 years. Traffic crossing the Bourne and Sagamore Bridges has increased 24% and 46% respectively. Traffic volumes on many of the Cape's smaller roads have increased four or five times in the past decade (Cotuit Road, Shore Road, Prospect Street). On the Cape's major roads such as Route 28, Route 132 and Route 6A, traffic volumes have more than doubled in many places.

CONCLUSION

Over the past 10 years, traffic volumes have doubled on Cape Cod and traffic continues to grow at a rate of about 5% per year. At this rate, traffic volumes will double again by the year 2000, resulting in an overall four fold increase in traffic from 1975 levels. Cape Cod's road infrastructure can not handle these growth rates indefinitely. If growth continues unabated, congestion will reach the point where traffic will slow to a crawl, resulting in a decline in traffic volumes.

The solutions to the traffic problems on Cape Cod are difficult. Land for new roads or for widening existing roads is often unavailable because of existing land uses. There is also concern that additional pavement will cause a further contamination of our water supply from road runoff as well as diminishing our water supply by covering more of the groundwater recharge areas. Additionally, there is the fear that new roads may only serve to attract more vehicles, defeating the original purpose of the new road.

Aside from building new roads, the following are a few of the ways to alleviate Cape Cod's traffic problems:

1) Perform Intersection Analyses.

Quite often, traffic congestion can be traced to a signalized intersection. Poor signal timing or bad layouts can impede the flow of traffic. In recent years many computer programs have been developed to optimize signal timing. Often a change in signal timing can noticeably improve traffic flow at an intersection.

These programs are also useful in evaluating possible improvements at intersections, such as left or right turn only lanes. They can also be used to evaluate the impacts of a new project on a roadway or nearby intersection.

2) Provide Adequate Parking and Signs.

A substantial amount of traffic in some areas, such as Provincetown, is caused by vehicles searching for parking. Furthermore, vehicles parking on narrow streets often contribute to congestion. Adequate off street parking, with signs to direct traffic, can help alleviate this problem.

3) Zoning.

It is important that traffic impacts be considered as part of the local approval process. In areas with severe congestion, new projects with high trip generation (such as a convenience store or a fast food restaurant) should be discouraged. Instead, low trip generation land uses (light industry or offices) should be considered. Projects with high trip generation on an already overloaded road should not be allowed in the interest of safety and congestion, unless sufficient mitigation measures can be implemented and are agreed to by the Town and the developer.

Many Cape Cod towns have or are considering driveway standards (separation and width) to avoid heavy traffic congestion. By reducing the number of turning conflicts on a section of road, potential traffic congestion is reduced.

4) Traffic Impact Studies.

Projects that may effect traffic flow in an area should be required to perform traffic impact analyses. Items covered should include:

- Estimate of Trip Generation
- Existing traffic conditions in the area
- Comparison of level of service before and after the project
- Review of accidents in the area
- Site drive layout and analysis
- Analysis of Internal Circulation and Parking
- Proposed traffic mitigation measures

Only through these analyses can town and regional officials properly assess the impacts of a project and plan proper mitigating measures to avoid congestion and safety problems.

5) Local Traffic Study Committees.

Many towns have formed committees to address local traffic problems. Issues addressed include:

- Parking, sidewalk and bikeway planning.
- Coordination with MDPW on projects in their town.
- Traffic impacts of new projects.

The local input and perspective these committees provide is often useful in trying to find solutions to traffic problems.

6) Bike Paths.

Bicycles are an environmentally sound alternative to cars. They can be used for commuting, for sightseeing, to go to beaches and for a variety of other uses. Providing an extensive network of bike paths and promoting the use of bicycles can help alleviate traffic congestion. It is important to provide separate facilities for bicycles for safety reasons and to reduce their conflicts with automobile traffic.

7) Buses/Vans.

In limited cases, buses may be useful to alleviate traffic congestion. These may include shuttles from motels to beaches and to certain shopping areas. Some hotels even provide a shuttle service to popular destinations as a condition of their approval by local zoning boards.

In short, there are no simple solutions to Cape Cod's traffic problems. Traffic has increased at an alarming rate over the past ten years. It continues to increase rapidly. To alleviate the Cape's traffic problems a broad array of programs and measures must be implemented. Cooperation among towns, their residents, visitors, developers and regional officials is critical.



TABLE 1. CAPE COD TRAFFIC COUNTS 1986

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|------------|------------------|------------------------|--------------------------|
| BOURNE | | | | | |
| 0065 | Meetinghouse Lane west of Old Plymouth Road | 6818 | 5560 | 538 | 5-6 P.M. 7-31-86 |
| 7118 | Sandwich Road west of Sagamore Bridge | 13,989 | 12,943 | 1197 | 3-4 P.M. 9-15-86 |
| 7119 | Shore Road north of County Road | 6436 | 4984 | 591 | 3-4 P.M. 8-1-86 |
| 7120 | Shore Road north of Beach Street | 4732 | 3613 | 421 | 4-5 P.M. 7-31-86 |
| 7121 | Old Plymouth Road south of Morris Road | 1740 | 1273 | 177 | 5-6 P.M. 8-1-86 |
| 7122 | Route 6 and 28 east of Head of the Bay Road | 25,483 | 19,499 | 1914 | 5-6 P.M. 8-1-86 |
| SANDWICH | | | | | |
| 0034 | Route 6A west of Tupper Road | 8839 | 9493 | 990 | 11-12 NOON 4-26-86 |
| 0035 | Route 6A east of Tupper Road | 9977 | 11,351 | 1120 | 11-12 NOON 4-26-86 |
| 0036 | Tupper Road north of Route 6A | 5375 | 5760 | 561 | 11-12 NOON 4-26-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|------------------|---|------------|------------------|------------------------|--------------------------|
| SANDWICH (cont.) | | | | | |
| 0037 | Tupper Road south of Route 6A | 4786 | 4990 | 628 | 9-10 A.M. 4-26-86 |
| 0063 | Quaker Meetinghouse Road east of Cotuit Road | 5772 | 4479 | 463 | 4-5 P.M. 7-17-86 |
| " | Quaker Meetinghouse Road west of Cotuit Road | 5175 | 3953 | 467 | 4-5 P.M. 7-16-86 |
| " | Cotuit Road north of Quaker Meetinghouse Rd. | 10,387 | 7873 | 869 | 5-6 P.M. 7-16-86 |
| " | Cotuit Road south of Quaker Meetinghouse Rd. | 9462 | 7327 | 797 | 5-6 P.M. 7-17-86 |
| ALMOUTH | | | | | |
| 0064 | Route 151 total east of Route 28 | 12,299 | 9951 | 1028 | 4-5 P.M. 7-21-86 |
| " | Route 151 eastbound east of Route 28 | 6093 | 4855 | 505 | 4-5 P.M. 7-22-86 |
| " | Route 151 westbound east of Route 28 | 6226 | 5095 | 525 | 4-5 P.M. 7-21-86 |
| 7124 | Thomas Landers Road east of Route 28 | 1781 | 1671 | 164 | 3-4 P.M. 9-16-86 |
| 7126 | County Road west of Main Street | 3745 | 3025 | 336 | 11-12 NOON 7-23-86 |
| 7130 | Surf Drive west of Shore Street | 9195 | 7547 | 817 | 4-5 P.M. 7-22-86 |

CAPE COD TRAFFIC COUNTS - 1986 (cont.)

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|---|------------|------------------|------------------------|--------------------------|
| MASHPEE | | | | | |
| 0017 | Route 151 total west of Mashpee Rotary | 13,580 | 10,881 | 1180 | 4-5 P.M. 7-15-86 |
| " | Route 151 eastbound west of Mashpee Rotary | 6731 | 5311 | 540 | 5-6 P.M. 7-14-86 |
| " | Route 151 westbound west of Mashpee Rotary | 6849 | 5569 | 649 | 4-5 P.M. 7-15-86 |
| 0018 | Great Neck Road south of Donnas Lane | 10,222 | 8107 | 899 | 12-1 P.M. 7-14-86 |
| 0062 | South Sandwich Road north of Route 130 | 1724 | 1284 | 181 | 3-4 P.M. 7-16-86 |
| 0108 | Route 28 east of Old Mill Road | 21,210 | 16,914 | 1765 | 5-6 P.M. 7-14-86 |
| 0118 | Route 28 total west of Mashpee Rotary | 17,604 | 13,753 | 1355 | 12-1 P.M. 7-14-86 |
| " | Route 28 eastbound west of Mashpee Rotary | 8660 | 6636 | 726 | 10-11 A.M. 7-16-86 |
| " | Route 28 westbound west of Mashpee Rotary | 8944 | 7117 | 723 | 4-5 P.M. 7-14-86 |
| 0120 | Route 130 west of Central Street | 8315 | 6672 | 649 | 4-5 P.M. 7-21-86 |
| BARNSTABLE | | | | | |
| 0009 | Main Street west of Yarmouth Road | 27,280 | 20,827 | 1588 | 5-6 P.M. 7-25-86 |

DATE COD TRAFFIC COUNTS 1986. (cont.)

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|--------------------|---|------------|------------------|------------------------|--------------------------|
| BARNSTABLE (cont.) | | | | | |
| 0010 | Main Street west of Center Street | 19,333 | 14,901 | 1265 | 10-11 A.M. 7-24-86 |
| 0038 | Phinneys Lane south of Route 132 | 8585 | 9212 | 746 | 4-5 P.M. 4-17-86 |
| 0039 | Route 132 west of Phinneys Lane | 24,276 | 25,283 | 2045 | 4-5 P.M. 4-18-86 |
| 0040 | Route 132 east of Phinneys Lane | 27,617 | 29,583 | 2423 | 4-5 P.M. 4-18-86 |
| 0041 | Phinneys Lane north of Route 132 | 4171 | 4745 | 407 | 2-3 P.M. 4-21-86 |
| 0126 | Route 28 west of Old Stage Road | 27,491 | 21,262 | 1877 | 5-6 P.M. 7-23-86 |
| 7131 | Route 132 south of Route 6 | 31,963 | 24,572 | 2280 | 4-5 P.M. 7-25-86 |
| 7134 | North Street west of Barnstable Road | 10,792 | 8412 | 839 | 2-3 P.M. 8-13-86 |
| 7135 | Ocean Avenue south of Sea Street | 6289 | 4806 | 543 | 4-5 P.M. 7-24-86 |
| BARNSTABLE | | | | | |
| 0015 | Willow Street south of Railroad crossing | 9872 | 7847 | 851 | 4-5 P.M. 7-28-86 |
| 0016 | Route 28 west of Main Street | 23,927 | 18,651 | 1600 | 6-7 P.M. 7-28-86 |

CAPE COD TRAFFIC COUNTS 1986 (cont.)

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|------------------|--|------------|------------------|------------------------|--------------------------|
| YARMOUTH (cont.) | | | | | |
| 0042 | Route 28 east of Forest Road | 16,309 | 19,028 | 1481 | 3-4 P.M. 4-9-86 |
| 0043 | Forest Road north of Route 28 | 6110 | 7125 | 630 | 3-4 P.M. 4-9-86 |
| 0044 | Route 28 west of Forest Road | 13,789 | 16,098 | 1475 | 2-3 P.M. 4-8-86 |
| 0045 | Forest Road south of Route 28 | 3478 | 4057 | 380 | 3-4 P.M. 4-9-86 |
| 0046 | East Main Street west of Route 28 | 13,166 | 15,352 | 1224 | 3-4 P.M. 4-11-86 |
| 0047 | Route 28 east of East Main Street | 28,656 | 33,407 | 2618 | 3-4 P.M. 4-12-86 |
| 7136 | Route 28 west of East Main Street | 17,729 | 20,170 | 1670 | 1-2 P.M. 4-12-86 |
| 0109 | Higgins Crowell Road north of Abells Road | 6555 | 5160 | 586 | 12-1 P.M. 7-29-86 |
| 0124 | Buck Island Road east of West Yarmouth Road | 11,364 | 9099 | 1050 | 4-5 P.M. 7-28-86 |
| 0125 | Main Street east of Wood Road | 6846 | 5306 | 561 | 12-1 P.M. 7-29-86 |
| 7140 | Great Western Road over Route 6 | 5527 | 4005 | 438 | 5-6 P.M. 7-28-86 |

| STATION ID # | COUNTY LOCATION | AADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|-------------|------------------|------------------------|--------------------------|
| DENNIS | | | | | |
| 0003 | Route 134 southbound north of Upper County Road | 11,260 | 10,040 | 1188 | 11-12 NOON 6-21-86 |
| 0004 | Route 134 northbound north of Upper County Road | 10,841 | 9500 | 1024 | 11-12 NOON 6-21-86 |
| 0141 | Route 134 total north of Upper County Road | 22,571 | 19,725 | 2212 | 11-12 NOON 6-21-86 |
| | Route 6 total at Harwich town line | 15,890 | 19,008 | 1413 | 4-5 P.M. 3-28-86 |
| | " | 17,272 | 17,450 | 1582 | 4-5 P.M. 5-15-86 |
| | " | 22,221 | 21,598 | 2097 | 11-12 NOON 5-26-86 |
| 7170 | " | 26,546 | 18,895 | 2590 | 5-6 P.M. 7-3-86 |
| | " | 31,247 | 24,721 | 2381 | 11-12 NOON 8-6-86 |
| 0029 | Route 6 eastbound at Harwich town line | 9085 | 8760 | 950 | 5-6 P.M. 5-2-86 |
| | " | 8979 | 9046 | 973 | 11-12 NOON 5-10-86 |
| | " | 11,143 | 10,662 | 1413 | 5-6 P.M. 5-23-86 |
| 0030 | Route 6 westbound at Harwich town line | 8294 | 8404 | 962 | 4-5 P.M. 5-11-86 |
| | " | 11,078 | 10,937 | 1566 | 11-12 NOON 5-26-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|------------|------------------|------------------------|--------------------------|
| DEHRIS (cont.) | | | | | |
| 0031 | Entrance ramp to Route 6 eastbound from Exit 9. | 1611 | 1564 | 150 | 11-12 NOON 5-2-86 |
| 0032 | Entrance ramp to Route 6 westbound from Exit 9 | 6017 | 5190 | 601 | 4-5 P.M. 5-4-86 |
| 0033 | Route 6 westbound at Yarmouth town line | 12,889 | 11,118 | 1420 | 4-5 P.M. 5-4-86 |
| 0049 | Upper County Road east of Route 134 | 15,618 | 14,090 | 1424 | 4-5 P.M. 6-17-86 |
| 0050 | Route 134 northbound south of Upper County Road | 5094 | 4732 | 535 | 11-12 NOON 6-14-86 |
| 0051 | Route 134 southbound south of Upper County Road | 5406 | 4818 | 595 | 11-12 NOON 6-14-86 |
| | Route 134 total south of Upper County Road | 10,170 | 9449 | 1130 | 11-12 NOON 6-14-86 |
| 0052 | Upper County Road west of Route 134 | 11,622 | 10,408 | 1124 | 4-5 P.M. 6-20-86 |
| 0066 | Route 28 east of Telegraph Road | 13,365 | 10,834 | 1004 | 8-9 P.M. 8-5-86 |
| 0077 | Route 28 west of Sea Street | 16,649 | 12,703 | 1159 | 7-8 P.M. 8-4-86 |
| 0164 | Route 28 west of Woodbine Drive | 14,845 | 13,859 | 1199 | 11-12 NOON 9-10-86 |
| 0166 | School Street south of Route 28 | 4517 | 4067 | 376 | 10-11 A.M. 9-11-86 |
| 7145 | Airline Road at Brewster town line | 2315 | 1878 | 192 | 4-5 P.M. 8-5-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|---|------------|------------------|------------------------|--------------------------|
| HARWICH | | | | | |
| 0021 | Queen Anne Road east of Old Chatham Road | 1869 | 2426 | 217 | 3-4 P.M. 3-26-86 |
| 0022 | Queen Anne Road east of Oak Street | 2682 | 3050 | 247 | 5-6 P.M. 4-2-86 |
| 0025 | Route 39 west of John Joseph Road | 5062 | 5498 | 461 | 4-5 P.M. 4-3-86 |
| 0026 | Great Western Road east of Depot Street | 3251 | 4100 | 316 | 4-5 P.M. 3-31-86 |
| 0053 | Route 6 between Exits 10 and 11 | 18,414 | 18,392 | 2821 | 12-1 P.M. 5-26-86 |
| | " | 22,922 | 16,316 | 2405 | 11-12 NOON 7-5-86 |
| 0073 | Route 28 total at Dennis town line | 19,742 | 15,085 | 1538 | 11-12 NOON 8-7-86 |
| " | Route 28 eastbound at Dennis town line | 9684 | 7490 | 796 | 11-12 NOON 8-7-86 |
| " | Route 28 westbound at Dennis town line | 10,058 | 7595 | 748 | 1-2 P.M. 8-8-86 |
| 0074 | Route 28 total at Chatham town line | 17,629 | 9696 | 1042 | 3-4 P.M. 8-7-86 |
| " | Route 28 eastbound at Chatham town line | 6239 | 4808 | 539 | 11-12 NOON 8-7-86 |
| " | Route 28 westbound at Chatham town line | 6391 | 4888 | 585 | 4-5 P.M. 8-7-86 |

STATION
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Page (cont.)

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|---|------------|------------------|------------------------|--------------------------|
| HARWICH (cont.) | | | | | |
| 0075 | Route 39 at Brewster town line | 3721 | 3502 | 371 | 3-4 P.M. 9-23-86 |
| 0097 | Queen Anne Road total east of Depot Street | 2648 | 2386 | 274 | 4-5 P.M. 9-2-86 |
| " | Queen Anne Road eastbound east of Depot Street | 1049 | 986 | 129 | 4-5 P.M. 9-2-86 |
| " | Queen Anne Road westbound east of Depot Street | 1570 | 1400 | 161 | 2-3 P.M. 9-2-86 |
| 0098 | Queen Anne Road total west of Route 124 | 2769 | 2556 | 287 | 1-2 P.M. 9-2-86 |
| " | Queen Anne Road eastbound west of Route 124 | 1358 | 1250 | 141 | 1-2 P.M. 9-2-86 |
| " | Queen Anne Road westbound west of Route 124 | 1411 | 1306 | 150 | 12-1 P.M. 9-2-86 |
| 7147 | Pleasant Lake Avenue north of Main Street | 10,838 | 8115 | 887 | 3-4 P.M. 8-7-86 |
| BREWSTER | | | | | |
| 0020 | Route 6A east of Route 124 | 7828 | 9000 | 818 | 11-12 NOON 4-5-86 |
| 0023 | Route 6A east of Stoney Brook Road | 3606 | 4509 | 570 | 2-3 P.M. 3-29-86 |
| 0027 | Freemans Way east of the Industrial Park | 1219 | 1329 | 121 | 1-2 P.M. 4-3-86 |

STATION
ID #

COUNTY

(CONT.)

| STATION ID # | COUNTY LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|------------------|---------------------------------------|------------|------------------|------------------------|--------------------------|
| BREWSTER (cont.) | | | | | |
| 0028 | Setucket Road west of Red Top Road | 3335 | 4190 | 365 | 4-5 P.M. 3-28-86 |
| 0072 | Route 6A at Dennis town line | 8939 | 6926 | 837 | 12-1 P.M. 8-13-86 |
| 0076 | Route 6A at Orleans town line | 10,612 | 11,489 | 1106 | 12-1 P.M. 4-5-86 |
| | " | 19,337 | 15,588 | 1610 | 4-5 P.M. 8-12-86 |
| 0081 | Route 124 at Harwich town line | 6228 | 4998 | 495 | 5-6 P.M. 8-12-86 |
| 0082 | Route 124 south of Route 6A | 5695 | 4483 | 522 | 4-5 P.M. 8-11-86 |
| 0096 | Route 137 at Harwich town line | 4882 | 4506 | 442 | 4-5 P.M. 9-3-86 |
| 0180 | Millstone Road north of Route 137 | 2319 | 2165 | 202 | 4-5 P.M. 9-9-86 |
| 7141 | Route 6 at Orleans town line | 13,912 | 13,544 | 1581 | 11-12 NOON 5-26-86 |
| | " | 18,516 | 13,180 | 2109 | 11-12 NOON 7-5-86 |
| | " | 19,977 | 15,522 | 1697 | 4-5 P.M. 8-25-86 |
| 7142 | Route 137 south of Route 6A | 2439 | 2259 | 244 | 3-4 P.M. 9-3-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|---|------------|------------------|------------------------|--------------------------|
| CHATHAM | | | | | |
| 0011 | Stoney Hill Road east of Route 28 | 1955 | 1396 | 210 | 11-12 NOON 7-3-86 |
| 0012 | Route 28 west of Stoney Hill Road | 8707 | 6327 | 980 | 12-1 P.M. 7-3-86 |
| 0054 | Stepping Stone Road south of Heritage Lane | 3324 | 2270 | 452 | 11-12 NOON 7-3-86 |
| 0055 | Route 28 east of Heritage Lane | 19,767 | 14,957 | 1620 | 11-12 NOON 7-31-86 |
| 0108 | Route 137 total south of Middle Road | 5092 | 3781 | 518 | 11-12 NOON 7-3-86 |
| " | Route 137 northbound south of Middle Road | 2504 | 1809 | 272 | 11-12 NOON 7-3-86 |
| " | Route 137 southbound south of Middle Road | 2588 | 1972 | 246 | 11-12 NOON 7-3-86 |
| ORLEANS | | | | | |
| 0024 | Route 28 total north of Route 39 | 13,437 | 10,600 | 1239 | 12-1 P.M. 7-9-86 |
| " | Route 28 northbound north of Route 39 | 6710 | 5275 | 664 | 11-12 NOON 7-9-86 |
| " | Route 28 southbound north of Route 39 | 6728 | 5325 | 645 | 12-1 P.M. 7-9-86 |
| " | Route 28 north of Route 39 | 8558 | 9290 | 898 | 2-3 P.M. 4-5-86 |

County of ...

Notation # 11

| STATION ID # | COUNT LOCATION | AADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|---|-------------|------------------|------------------------|--------------------------|
| ORLEANS (cont.) | | | | | |
| 0014 | Main Street east of Route 6A | 11,624 | 8929 | 1265 | 10-11 A.M. 8-28-86 |
| 0056 | Beach Road total east of Hauset Road | 6252 | 4450 | 727 | 3-4 P.M. 7-4-86 |
| " | Beach Road westbound east of Hauset Road | 3065 | 2182 | 544 | 3-4 P.M. 7-4-86 |
| " | Beach Road eastbound east of Hauset Road | 3187 | 2269 | 602 | 10-11 A.M. 7-4-86 |
| 0056 | Beach Road total east of Hauset Road | 5826 | 3957 | 694 | 3-4 P.M. 8-23-86 |
| " | Beach Road eastbound east of Hauset Road | 2968 | 2015 | 576 | 9-10 A.M. 8-23-86 |
| " | Beach Road westbound east of Hauset Road | 2858 | 1942 | 495 | 3-4 P.M. 8-23-86 |
| 0061 | Hauset Road total north of Beach Road | 2895 | 1963 | 326 | 4-5 P.M. 8-23-86 |
| " | Hauset Road northbound north of Beach Road | 1206 | 817 | 175 | 11-12 NOON 8-23-86 |
| " | Hauset Road southbound north of Beach Road | 1689 | 1145 | 242 | 4-5 P.M. 8-23-86 |
| 0057 | Route 39 total south of Route 28 | 5793 | 4577 | 487 | 4-5 P.M. 7-8-86 |
| " | Route 39 northbound south of Route 28 | 2931 | 2314 | 252 | 11-12 NOON 7-9-86 |
| " | Route 39 southbound south of Route 28 | 2862 | 2263 | 274 | 5-6 P.M. 7-7-86 |

STATION
ID #

COUNT

TIME (min)

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|------------|------------------|------------------------|--------------------------|
| ORLEANS (cont.) | | | | | |
| 0095 | Route 28 south of Route 39 | 7856 | 6187 | 834 | 12-1 P.M. 8-27-86 |
| 0154 | West Road north of Route 6A | 7112 | 5508 | 713 | 12-1 P.M. 8-27-86 |
| 0155 | Bay Ridge Rd. southbound north of Route 6A | 701 | 824 | 76 | 11-12 NOON 12-11-86 |
| 0156 | Rock Harbor Road west of Frontage Road | 4682 | 3648 | 516 | 12-1 P.M. 8-27-86 |
| 0158 | Canal Road east of Bridge Road | 1242 | 970 | 152 | 12-1 P.M. 8-27-86 |
| 0169 | Route 6A total east of Bakers Pond Road | 12,422 | 15,111 | 1188 | 4-5 P.M. 12-10-86 |
| " | Route 6A eastbound east of Bakers Pond Road | 6028 | 7306 | 547 | 4-5 P.M. 12-10-86 |
| " | Route 6A westbound east of Bakers Pond Road | 6394 | 7805 | 652 | 4-5 P.M. 12-11-86 |
| 0170 | Bakers Pond Road total south of Route 6A | 2592 | 3211 | 267 | 3-4 P.M. 12-10-86 |
| " | Bakers Pond Road northbound south of Route 6A | 795 | 980 | 59 | 3-4 P.M. 12-10-86 |
| " | Bakers Pond Road southbound south of Route 6A | 1797 | 2231 | 182 | 5-6 P.M. 12-10-86 |
| 0173 | Beach Road west of Mill Lane | 7442 | 6201 | 774 | 10-11 A.M. 8-26-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|------------|------------------|------------------------|--------------------------|
| ORLEANS (cont.) | | | | | |
| 7148 | Route 6 total at Eastham town line | 13,092 | 12,433 | 1442 | 12-1 P.M. 5-26-86 |
| " | Route 6 eastbound at Eastham town line | 4910 | 4686 | 848 | 12-1 P.M. 5-25-86 |
| " | Route 6 westbound at Eastham town line | 7192 | 7063 | 1058 | 12-1 P.M. 5-26-86 |
| 7148 | Route 6 at Eastham town line | 17,096 | 12,169 | 1841 | 12-1 P.M. 7-5-86 |
| EASTHAM | | | | | |
| 0058 | Route 6 north of Rotary | 31,102 | 23,081 | 2999 | 11-12 NOON 7-12-86 |
| 0163 | South Eastham Street total west of Route 6 | 433 | 596 | 58 | 5-6 P.M. 2-28-86 |
| " | South Eastham St. eastbound west of Route 6 | 214 | 294 | 32 | 5-6 P.M. 2-28-86 |
| " | South Eastham St. westbound west of Route 6 | 220 | 302 | 31 | 12-1 P.M. 3-1-86 |
| 0159 | Route 6 north of Kingsbury Beach Road | 27,873 | 20,683 | 2593 | 11-12 NOON 7-12-86 |
| WELLFLEET | | | | | |
| 0059 | Main Street west of Route 6 | 10,233 | 7284 | 911 | 11-12 NOON 7-12-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-------------------|--|------------|------------------|------------------------|--------------------------|
| WELLFLEET (cont.) | | | | | |
| 0048 | Route 6 total south of Cove Road | 8328 | 8640 | 701 | 3-4 P.M. 5-8-86 |
| " | Route 6 northbound south of Cove Road | 4294 | 4455 | 378 | 3-4 P.M. 5-8-86 |
| " | Route 6 southbound south of Cove Road | 4034 | 4185 | 376 | 4-5 P.M. 5-8-86 |
| 0048 | Route 6 total south of Cove Road | 25,356 | 19,211 | 2177 | 3-4 P.M. 8-7-86 |
| " | Route 6 northbound south of Cove Road | 12,961 | 9814 | 1280 | 11-12 NOON 8-10-86 |
| " | Route 6 southbound south of Cove Road | 12,395 | 9397 | 1207 | 4-5 P.M. 8-6-86 |
| 0060 | Briar Lane west of Route 6 | 3270 | 2429 | 356 | 11-12 NOON 7-12-86 |
| 0078 | Route 6 at Truro town line | 19,295 | 14,052 | 1671 | 11-12 NOON 8-16-86 |
| 0084 | Commercial Street south of Holbrook Avenue | 8225 | 5678 | 721 | 11-12 NOON 8-16-86 |
| 0085 | Lieutenant Island Road west of Route 6 | 1767 | 1246 | 188 | 11-12 NOON 8-15-86 |
| 0087 | Route 6 at Eastham town line | 25,883 | 19,808 | 2279 | 11-12 NOON 8-14-86 |
| 0099 | Ocean View Drive north of White Crest Beach | 1608 | 1193 | 144 | 3-4 P.M. 7-10-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-------------------|--|------------|------------------|------------------------|--------------------------|
| WELLFLEET (cont.) | | | | | |
| 0160 | Route 6 north of Lecount Hollow Road | 25,501 | 18,556 | 2418 | 11-12 NOON 8-16-86 |
| 0165 | Route 6 south of Long Pond Road | 19,242 | 14,010 | 1652 | 11-12 NOON 8-16-86 |
| 0171 | Cahoon Hollow Road east of Route 6 | 1876 | 1392 | 180 | 4-5 P.M. 7-11-86 |
| TRURO | | | | | |
| 0079 | Route 6 at Provincetown town line | 13,887 | 11,054 | 1366 | 3-4 P.M. 8-19-86 |
| 0080 | Route 6A at Provincetown town line | 5574 | 4806 | 530 | 3-4 P.M. 8-19-86 |
| 0086 | Route 6 south of Union Field Road | 16,256 | 14,106 | 1704 | 3-4 P.M. 8-19-86 |
| 0087 | Route 6 north of Truro Central School | 18,239 | 15,731 | 1864 | 3-4 P.M. 8-19-86 |
| 0088 | Route 6A north of Route 6 | 2701 | 2558 | 273 | 12-1 P.M. 9-10-86 |
| 0089 | Castle Road west of Route 6 | 648 | 595 | 65 | 2-3 P.M. 9-9-86 |
| 0167 | Route 6 south of Route 6A | 19,679 | 15,588 | 1737 | 2-3 P.M. 8-19-86 |
| 0168 | Route 6 south of Castle Road | 17,477 | 15,072 | 1815 | 3-4 P.M. 8-19-86 |

| STATION ID # | COUNT LOCATION | ADT RAW | AADT FACTORED | 48 HOUR PEAK VOLUME | TIME AND DATE OF PEAK |
|-----------------|--|------------|------------------|------------------------|--------------------------|
| PROVINCETOWN | | | | | |
| 0090 | Bradford Street between Conwell and Johnson | 17,125 | 13,106 | 1288 | 4-5 P.M. 8-21-86 |
| 0091 | Bradford Street between Ryder and Standish | 14,989 | 11,451 | 1286 | 4-5 P.M. 8-21-86 |
| 0092 | Bradford Street between Winslow and Prince | 11,566 | 8852 | 1168 | 4-5 P.M. 8-22-86 |
| 0093 | Bradford Street west of Shankpainter | 11,605 | 8850 | 942 | 4-5 P.M. 8-21-86 |
| 0094 | Bradford Street between Winslow and Ryder | 12,343 | 9446 | 1109 | 2-3 P.M. 8-21-86 |
| 7151 | Conwell Street south of Route 6 | 9377 | 7182 | 837 | 4-5 P.M. 8-21-86 |

TABLE 2.

COMPARISONS OF WEEKDAY COUNTS IN 1984 AND 1986
1984 - 1986

| TOWN | COUNT ID # | LOCATION | 1984 | 1985 | 1986 | ANNUAL GROWTH RATE |
|------------|---------------|---|--------------------|-----------------------|-----------------------|-----------------------|
| DORCHESTER | 7119 | Shore Rd. north of County Rd. | 5731 Tues. 8-7 | | 6436 Thurs. 7-31 | + 6% |
| | 7120 | Shore Rd. north of Beach St. | 4560 Tues. 8-7 | | 4732 Thurs. 7-31 | + 2% |
| | 7121 | Old Plymouth Rd. south of Morris Rd. | 1399 Thurs. 8-2 | | 1740 Thurs. 7-31 | + 12% |
| | 7126 | County Rd. west of Main St. | 3845 Tues. 7-24 | | 3745 Tues. 7-22 | - 1% |
| DORCHESTER | 7130 | Surf Drive west of Shore St. | 7920 Tues. 7-31 | | 9195 Tues. 7-22 | + 8% |
| | 0118 | Route 28 west of Mashpee Rotary | | 21,816 Fri. 7-19 | 17,604 Tues. 7-15 | - 19% |
| | 7131 | Route 132 south of Rt. 6 | | 30,627 Thurs. 7-25 | 31,963 Thurs. 7-24 | + 4% |
| DORCHESTER | 7135 | Ocean Ave. south of Sea St. | 4695 Tues. 7-10 | | 6289 Thurs. 7-24 | + 16% |
| | 0009 | Main St. west of Yarmouth Rd. | | 21,689 Tues. 7-30 | 27,280 Thurs. 7-24 | + 26% |
| | 0010 | Main St. west of Center St. | | 18,104 Tues. 7-30 | 19,333 Thurs. 7-24 | + 7% |
| DORCHESTER | 7140 | Great Western Rd. over Rt. 6 | 5329 Tues. 8-7 | 4181 Thurs. 8-1 | 5527 Tues. 7-29 | + 2% |
| | 0072 | Route 6A @ Brewster town line | 9545 Thurs. 8-9 | | 8939 Tues. 8-12 | - 3% |
| DORCHESTER | 7145 | Airline Rd. @ Brewster town line | 2211 Thurs. 8-9 | | 2315 Tues. 8-5 | + 2% |

| ID # | | LOCATION | 1984 | 1985 | 1986 | ANNUAL GROWTH RATE |
|---------|------|---|-----------------------|-----------------------|-----------------------|-----------------------|
| DENNIS | 7170 | Route 6 @ Harwich town line | | 30,712 Tues. 8-6 | 31,247 Tues. 8-5 | + 2% |
| ARWICH | 0073 | Route 28 @ Dennis town line | 17,956 Thurs. 8-16 | | 19,742 Thurs. 8-7 | + 5% |
| | 0074 | Route 28 @ Chatham town line | 11,850 Thurs. 8-16 | | 12,629 Thurs. 8-7 | + 3% |
| | 7147 | Pleasant Lake Ave. north of Main St. | 9058 Thurs. 8-16 | 10,295 Thurs. 8-8 | 10,838 Thurs. 8-7 | + 9% |
| REWSTER | 7141 | Route 6 @ Orleans town line | 18,115 Tues. 8-21 | | 19,977 Wed. 8-27 | + 5% |
| | 7142 | Route 137 south of Route 6A | 2820 Tues. 8-21 | 2911 Thurs. 8-22 | | + 3% |
| | 7143 | Route 124 south of Rt. 137 | 4314 Tues. 8-21 | 5818 Thurs. 8-22 | | + 35% |
| | 7144 | Millstone Rd. south of Rt. 6A | 4138 Tues. 8-21 | 5428 Tues. 8-27 | | + 31% |
| | 0076 | Route 6A @ Orleans town line | 17,200 Thurs. 8-23 | | 19,337 Tues. 8-12 | + 6% |
| PLEANS | 7148 | Route 6 @ Eastham town line | 16,381 Thurs. 8-23 | 17,492 Tues. 8-13 | | + 7% |
| LFLEET | 0078 | Route 6 @ Truro town line | 16,221 Tues. 8-28 | | 19,295 Thurs. 8-14 | + 9% |
| | 0165 | Route 6 south of Long Pond Rd. | | 18,747 Thurs. 8-15 | 19,242 Thurs. 8-14 | + 3% |
| RURO | 0080 | Route 6A @ Provincetown town line | 5594 Tues. 8-28 | 5554 Tues. 8-20 | 5574 Tues. 8-19 | - 0.2% |

Table 3 Comparison of AADTs 1975 vs. 1984-1986

| Town | Road | MDPW (1975) | CCPEDC (1984-1986) | % Increase |
|------------|-----------------|-------------|--------------------|------------|
| <hr/> | | | | |
| Bourne | | | | |
| | Bourne Bridge | 21,132 | 26,179 (1984) | 24% |
| | Sagamore Bridge | 25,150 | 36,877 (1985) | 47% |
| | Shore Rd. | 735 | 4,984 (1986) | 578% |
| | Sandwich Rd. | 7,434 | 12,943 (1986) | 74% |
| Sandwich | | | | |
| | Route 6A | 4,500 | 11,351 (1986) | 152% |
| | Cotuit Rd. | 1,350 | 7,327 (1986) | 443% |
| Falmouth | | | | |
| | Route 151 | 4,725 | 9,951 (1986) | 111% |
| | Thomas Landers | 830 | 1,671 (1986) | 101% |
| | Route 28 | 10,800 | 19,233 (1985) | 76% |
| | Route 28 | 8,400 | 15,406 (1985) | 83% |
| Mashpee | | | | |
| | Route 28 | 8,400 | 15,422 (1985) | 84% |
| | Route 28 | 7,200 | 14,806 (1985) | 106% |
| | Route 151 | 4,095 | 10,881 (1986) | 166% |
| Barnstable | | | | |
| | Route 28 | 8,604 | 24,431 (1985) | 184% |
| | Route 28 | 9,900 | 25,308 (1985) | 156% |
| | Prospect St. | 900 | 4,886 (1985) | 443% |
| | Route 132 | 11,295 | 24,572 (1986) | 118% |
| | Yarmouth Rd. | 7,200 | 17,906 (1985) | 149% |
| Yarmouth | | | | |
| | Route 28 | 23,422 | 20,170 (1986) | -14% |
| | Route 28 | 14,700 | 19,028 (1986) | 29% |
| | Route 28 | 12,750 | 33,407 (1986) | 162% |
| Dennis | | | | |
| | Route 6A | 4,734 | 7,216 (1985) | 52% |
| | Route 6 | 10,800 | 23,596 (1985) | 118% |
| | Route 28 | 10,800 | 10,834 (1986) | 0% |
| Harwich | | | | |
| | Route 28 | 10,800 | 15,085 (1986) | 40% |
| | Route 28 | 10,800 | 9,696 (1986) | -10% |
| | Route 124 | 4,160 | 8,115 (1986) | 95% |
| | Route 39 | 2,970 | 5,498 (1986) | 85% |
| Chatham | | | | |
| | Route 28 | 6,120 | 14,957 (1986) | 144% |

Table 3 (Continued) Comparison of AADTs 1975 vs. 1984-1986

| Town | Road | MDPW (1975) | CCPEDC (1984-1986) | % Increase |
|--------------|-----------|-------------|--------------------|------------|
| <hr/> | | | | |
| Brewster | | | | |
| | Route 124 | 2,020 | 3,990 (1985) | 98% |
| | Route 137 | 1,818 | 4,506 (1986) | 148% |
| | Route 6A | 4,734 | 9,000 (1986) | 90% |
| Orleans | | | | |
| | Route 6A | 4,734 | 15,588 (1986) | 229% |
| | Route 6 | 4,995 | 11,038 (1985) | 121% |
| | Route 39 | 2,970 | 4,577 (1986) | 54% |
| Eastham | | | | |
| | Route 6 | 11,040 | 23,081 (1986) | 109% |
| Wellfleet | | | | |
| | Route 6 | 8,224 | 19,808 (1986) | 141% |
| | Route 6 | 6,400 | 19,211 (1986) | 200% |
| | Main St. | 3,220 | 7,284 (1986) | 126% |
| Truro | | | | |
| | Route 6 | 6,440 | 14,052 (1986) | 118% |
| | Route 6 | 3,680 | 12,243 (1985) | 233% |
| | Route 6A | 1,334 | 4,343 (1985) | 226% |
| Provincetown | | | | |
| | Route 6 | 3,680 | 11,009 (1985) | 199% |

APPENDIX A

TRAFFIC COUNTING PROGRAM

FIELD SHEETS

FIELD SHEET

LOCATION: _____

FIELD RECORDER: _____

ER: _____

DATA RECORD

| ID# | COUNTER# | AGENCY COUNTS | | DURATION | | | TIME | | ADT | ADT FACTORED | FUNCTIONAL CLASSIFICATION |
|-----|----------|---------------|--------|----------|----|----|-------|-----|-----|-----------------|------------------------------|
| | | MDPW | COUNTY | S | 24 | 48 | START | END | RAW | | |
| | | | | | | | | | | | |

NOTES:

HISTORY:

PORTABLE TRAFFIC RECORDER INSPECTION

Station

Route

Town

一

Time Inspected

Comments on
recorder operation

Signature

[illegible]

VOLUME SUMMARY

CONDUCTED IN COOPERATION WITH FEDERAL HIGHWAY ADMINISTRATION

Year _____

Station No. _____

Month _____

Route No. _____

or

Town _____

Street _____

[illegible]

FIGURE OF COUNT-

| Day | Weather | Road Conditions |
|-----------|---------|-----------------|
| Monday | | |
| Tuesday | | |
| Wednesday | | |
| Thursday | | |
| Friday | | |
| Saturday | | |
| Sunday | | |

A.W.D. =

FACTOR=

A.D.T. =

APPENDIX B

TRAFFIC COUNTING FACTORS FOR CAPE COD

APPENDIX B

TRAFFIC COUNTING FACTORS FOR CAPE COD

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEP. | OCT. | NOV. | DE |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| WEDAY | 1.5279 | 1.2978 | 1.3762 | 1.1377 | 1.0300 | 0.8914 | 0.7302 | 0.7565 | 0.9411 | 1.0241 | 1.1999 | 1.16 |
| THURSDAY | 1.6591 | 1.3840 | 1.4085 | 1.1935 | 1.0490 | 0.9612 | 0.8004 | 0.7960 | 0.9338 | 1.0934 | 1.3145 | 1.17 |
| FRIDAY | 1.5186 | 1.5189 | 1.3260 | 1.1660 | 1.0429 | 0.9490 | 0.7583 | 0.7770 | 0.9334 | 1.0735 | 1.1676 | 1.31 |
| SATURDAY | 1.5442 | 1.3592 | 1.2980 | 1.1409 | 1.0368 | 0.9174 | 0.7741 | 0.7653 | 0.8828 | 1.0722 | 1.2212 | 1.17 |
| SUNDAY | 1.3678 | 1.1911 | 1.1121 | 0.9569 | 0.8625 | 0.7767 | 0.7118 | 0.6903 | 0.8807 | 0.8592 | 1.0032 | 1.08 |
| MONDAY | 1.5727 | 1.2255 | 1.1156 | 0.9908 | 0.8617 | 0.7685 | 0.6700 | 0.6532 | 0.8732 | 0.8954 | 1.0612 | 1.19 |
| TUESDAY | 1.7372 | 1.2606 | 1.2304 | 1.1188 | 0.8811 | 0.8195 | 0.6838 | 0.7077 | 0.8750 | 0.9843 | 1.2009 | 1.34 |

Source - Massachusetts Department of Public Works,
Bureau of Transportation
Planning and Development.

APPENDIX C

LEVEL OF SERVICE DEFINITIONS

